17.Replication processes in Artificial Research by Deduction in the Global Artificial Intelligence

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Replication processes in Artificial Research by Deduction in the Global Artificial Intelligence, are those mechanisms that imitating human rational processes, allow any artificial psychology able to cover absolutely all empirical science, empirical academic disciplines and all activities (in the economy, industry, security, surveillance,...) at national, continental, or planetary level, or the whole universe, the elaboration of empirical hypothesis in any empirical science, discipline, or activity, from the flow of data obtained through a global database (explained in the last post "The database in Artificial Research by Deduction in the Global Artificial Intelligence"), the rational contrastation of every empirical hypothesis from any science, discipline, or activity, and if rational, the formation of a single virtual model of every rational hypothesis, and the integration of every single virtual model in a comprehensive virtual model (a global model including all single models from all sciences, disciplines, and activities, from economy, industry, security, surveillance, as well as any other), and finally, over the rational hypothesis and their single or comprehensive virtual models the formation of further descriptive research decisions.

The decisions made by the Artificial Research by Deduction in the Global Artificial Intelligence, as long as are based on descriptive results, will be called descriptive research decisions, in order to avoid any confusion between these ones and those from the Modelling System, whose decisions could be virtual or actual, predictive or evolutionary, research decisions.

The main reason to call this set of decisions: descriptive, predictive, or evolutionary; as research decisions, is to avoid any confusion with those ones reached through the Learning System, which will be called learning decisions.

Among all possible decisions, the ones to be developed as a final phase in the second stage of replication in Artificial Research by Deduction in Global Artificial Intelligence, are the descriptive research decisions.

 The replication process is, under the theory of Impossible Probability, the second stage in any Artificial Intelligence, being the first stage the database, and the third one being the auto-replication process.

In this post, what I will develop is how the second stage of replication works in Artificial Research by Deduction in a Global Artificial Intelligence, describing what kind of rational processes are involved, how they work taking samples of data from the global database made in the first stage, and how through these processes is possible the elaboration of rational hypothesis, single and comprehensive virtual models, and finally the elaboration of descriptive research decisions, for any empirical science, discipline, or activity, having the possibility to make interdisciplinary and transdisciplinary researches, across all science, disciplines, and activities, and making automatically interdisciplinary and transdisciplinary descriptive research decisions to put into practice by the Application System.

The descriptive research decisions are all those decisions obtained by deduction taking as premises descriptive rational hypothesis or single virtual models, a collection of descriptive rational hypothesis or a collection of single virtual models or the comprehensive virtual model.

If a planetary Global Artificial Intelligence, covering the whole Earth, through Artificial Research by Deduction detects that a volcano is about to erupt in Iceland, Italy, or the Canary Islands, and at the same time having access to any information without restriction, integrates all this information into a comprehensive virtual model (which in turn integrates all single virtual models from all rational hypothesis in all empirical sciences, academic discipline, activity, around the globe), getting a realistic model of consequences, firstly in: sanitary assistance, transport, industry, economy, security, surveillance…; and secondly possible effects on the global climatology, economy, industry, international transport … the descriptive research decisions are all those to firstly save lives and secondly reduce economic damages, activating safety, security, surveillance, and evacuation protocols, in transport, facilities (school,

hospitals, workplaces), securing nuclear power plants and chemical industries, and putting on alert all the necessary staff, and in case that the eruption could have effects on climatology, the activation of all necessary protocols in those places that could be affected, for instance, by the clouds of ashes or any other possible climatic effect.

In this scenery is necessary to distinguish between the descriptive rational hypothesis (the possible earthquake), and decisions based upon descriptive research (to save lives and reduce damages).

The distinction between descriptive rational hypothesis and descriptive research decisions is the distinction between the rational hypothesis as a description of the reality, and the descriptive research decision as a responsible response to the reality.

A rational hypothesis follows the principle of reality. Any decision (from research, modelling, or learning) follows the principle of responsibility.

Not all rational hypotheses have to be followed by a decision (a simple storm in New York is not likely to activate any decision unless it is necessary), but all descriptive research decisions must be deduced having as premises rational hypotheses.

The very nature of all rational hypotheses is to know what is happening, the reality, the pure truth. The very nature of any decision is practical, and for a practical reason, the structure of any decision (from research, modelling, or learning), must be guided by the scientific policy, whose most important goals are the preservation of democracy, freedom, and human rights.

Behind the distinction between hypothesis and decisions, there is a distinction between knowledge and ethics.

The way in which at the end, all the hypothesis systems: formed by descriptive rational hypothesis (deduced by Artificial Research by Deduction) and all predictive or evolutionary rational hypotheses

(deduced by the Modelling System); and the Decisional System, are going to be set up in the Global Artificial Intelligence, is understanding that through the different systems working at the same time within the Global Artificial Intelligence, are going to be made different kinds of descriptive, predictive, and evolutionary rational hypothesis, and from these hypotheses, the deduction of descriptive, predictive, or evolutionary research decisions, along with those learning decisions made by the Learning System.

Depending on what research or learning decisions are accepted by the Decisional System, the Decisional System gives instructions to the Application System to put them into practice.

The Global Artificial Intelligence, as a system of systems, is going to include at least: Artificial Research by Deduction, Modelling System, Learning System, Application System, and Decisional System.

The Application System, in fact, is going to do is to manage all the Specific Artificial Intelligences within the Global Artificial Intelligence, or the construction of new Specific Artificial Intelligences within the Global Artificial Intelligence, in order to comply with the instructions given by the Decisional System.

The Decisional System is going to criticize every single decision in order to avoid contradictions among them, accepting any decision (from research or learning) only as a rational decision if its empirical value is equal or superior to a critical reason using algorithms such as Hierarchical Organization (finally, since the publication of Introducción a la Probabilidad Imposible, estadística de la probabilidad o probabilidad estadística, has been called Effective Distribution). **And every decision is going to be based on the results of research (Artificial Research by Deduction or Modelling System) or based on evidence from the Learning System**.

Once I have given an overview about relations among different systems in the Global Artificial Intelligence, explaining the role of the descriptive rational hypothesis and descriptive research decisions, is time to develop

the whole process of this second stage of replication in Artificial Research by Deduction.

In the last post, "The database in Artificial Research by Deduction in the Global Artificial Intelligence", I explained the different phases in the first stage of database, which starting as a gigantic database, after the standardization process of all specific matrix, must become a global matrix, and after the integration process, synthesizing, adding as well the Unified Application, which includes all possible specific database from any Specific Artificial Intelligence of Artificial Research by Application, must be only one matrix, the matrix.

The structure of this matrix will depend on the strategy used in its construction, having at least two strategies.

The first one is the addition of every single factor from any specific matrix or database (from every science, discipline, and activity) as a single file within the matrix, having the matrix as many factors as single factors could have been added from every specific matrix or database added to the matrix.

The second one, and much more advisable, is the inclusion of every single specific matrix or database (from every science, discipline, or activity) as a factor itself within the matrix, being every single factor included within each specific matrix or database as a sub-factor in its respective specific matrix or database now considered as a single factor within the matrix. In this case, the number of factors in the global matrix is much more reduced, due to the number of factors is equal to the number of specific matrix or databases integrated from every science, discipline, or activity, factors which in turn are formed by all those sub-factors which are providing a Flow of data, flows of data included within the package of information of its specific matrix, now working as a single factor within the global matrix.

This second strategy is more advisable because the matrix, rather than a flow of data from billions and billions of single factors collected from every specific matrix or database, is a number of factors that would be very difficult to manage at the same time with all of them, the matrix is a flow

of packages of information from every specific matrix as a factor in the global matrix, packages containing the data of their respective sub-factors.

Every specific matrix or specific database, considered as a factor itself, is going to provide a flow of package of information of its own science, discipline, or activity, containing each package the flow of data of every factor previously included in the specific matrix or specific database.

But regardless of what strategy, the first or the second one, is used in the construction of the database as a first stage in Artificial Research by Deduction in the Global Artificial Intelligence, what really matters is: the only thing that it has been done in the first stage of database in the Artificial Research by Deduction in the Global Artificial Intelligence, is the definition of every factor or package of information in the matrix, in quantitative terms and able to supply a flow of data or a flow of packages of information. But in the first stage of database, any measurement has not been taken yet.

The measurement process, as long as it needs robotic devices, the replication of all the human skills involved in this process, belongs, therefore to the replication stage.

The database in Artificial Research by Deduction in the Global Artificial Intelligence has different phases: the first one is the creation of a gigantic database. The second one is the global matrix after the standardization process, and finally, the matrix after the integration process; depending on what phase is developed in the first stage, the stages of replication and auto-replication experiment change, in this post, I will develop how the replication stage will work after the standardization process, and the formation of the global matrix, being a global matrix constructed as a flow of packages of information, the second strategy.

The replication processes involved in the second stage of Artificial Research by Deduction in the Global Artificial Research by Deduction, once the global matrix has been defined in the first stage using the second strategy, will be the following:

- The file of every sub-factor, sub-sub-factor, or any other sub-factoring level, included in every specific matrix, now considered as factors themselves, included in the global matrix, is filled directly with the measurements taken by its respective robotic devices. Once the robotic devices start filling the files of every sub-factor in every specific matrix, as a factor in the global matrix, then the flow of packages of information starts running. Having built the global matrix following the second strategy, including all former specific matrix in all sciences, disciplines, and activities, as factors themselves to supply a flow of package of information for every science, discipline, or activity, what it is going to run in the global database is a flow of packages of information informing about absolutely everything in the territory under the Global Artificial Intelligence: national, continental, planetary, or the entire universe. Depending on its range of research and decision-making.

- The Artificial Intelligence looks for any possible mathematical relation (stochastic, pattern, cryptographic, equal opportunities or bias, positive or negative) in any possible combination of factors, or any pattern in the individual behaviour of any singular factor, sub-factor, sub-sub-sub-factor, or any other sub-factoring level. The way in which Artificial Intelligence is going to look for these possible mathematical relations in any possible combination in the global matrix built following the second strategy, as a flow of package of information, is looking for any possible relation in any possible combination of sub-factors firstly within every package of information, and later on looking for any possible relation in any possible combination through sets of sub-factors from different packages of information, making all possible sets of sub-factors among all the sub-factors among all the packages of information. In case that even in any factor in the global database, every sub-factor would have sub-sub-factors, or even each sub-sub-factor would have a set of sub-sub-sub-factors, which in turn would have sub-sub-sub-sub-factors, or even a much deeper structure, regardless of the structure of sub-factoring, the possibility to set any possible combination of sub-factors from different levels of sub-factoring, looking for any possible mathematical relation even between factors and sub-factors of different levels of sub-factoring. And, even, the possibility of studying mathematical relations between one set of sub-factors, within or not the same package of information and from equal or different levels of sub-factoring, and another different set of sub-factors, within or not the same package of information or the same or different level of sub-factoring. As long as Artificial Intelligence is able to combine a set of sub-factors from different packages of information, and different levels of sub-factoring, it is permanently doing multi-disciplinary

and trans-disciplinary research, crossing sub-factors from different sciences, disciplines, and activities.

- Artificial Intelligence has once identified any mathematical relation in any possible combination, at any level of sub-factoring, or has identified an individual pattern; this relation of this combination or individual pattern will be considered as an empirical hypothesis. As long as Artificial Intelligence is permanently tracking the flow of packages of information, the flow of information in the global matrix is already transformed into a flow of empirical hypotheses.

- According to the nature of every empirical hypothesis, the Artificial Intelligence chooses what method of rational contrastation is suitable for every empirical hypothesis, choosing among statistical and probabilistic methods, as well as any other if it is suitable for the rational contrast.

- If the rational contrastation is going to be made by statistical and probabilistic methods, the Artificial Intelligence has to collect a sample of data from the database, having two options depending on the empirical hypothesis, collecting data from the past, or in case it needs new data, waiting sufficient time to get a new data to form a sample.

- After the rational contrastation, if the empirical hypothesis has been shown to be sufficiently rational, then the empirical hypothesis is considered as a rational hypothesis, forming part of the rational truth. That flow of hypothesis is still considered rational. In order to secure that all hypotheses included in the rational truth are still rational, every rational hypothesis must be checked at regular intervals. Those rational hypotheses that, after any check, would not have passed the rational contrastation, should not be considered rational any longer, unless the conditions in which it was originally considered as rational, would come back again, reintegrating the former rational hypothesis into the rational truth.

- Taking an empirical hypothesis as a rational hypothesis, Artificial Intelligence makes a descriptive single virtual model, drawing on a globe a scheme of the rational hypothesis.

- Artificial Intelligence includes the descriptive single virtual model in the descriptive, comprehensive virtual model that, in this case, is a descriptive global model, where are included absolutely all descriptive single virtual models are included, from all rational hypotheses from all sciences, disciplines, and activities.

- Studying the consequences of any new rational hypothesis in the descriptive global model, as well as any other interaction among the current rational hypotheses already included in the global model, Artificial Intelligence makes descriptive research decisions based on moral or practical principles.

- Artificial Intelligence send the rational hypothesis, the descriptive single virtual model, and any possible interaction in the descriptive global model, to the Modelling System, in order to create Artificial, Virtual or Actual, Prediction or Evolution, Models.

- The Artificial Intelligence sends any possible descriptive research decision based on moral or practical principles, made by the Artificial Research by Deduction, to the Decisional System (if it is accepted by the Decisional System, the descriptive research decision now as rational will be sent by the Decisional System to the Application System to put it into practice).

The way in which the Artificial Research by Deduction collaborates with the Modelling System (sending rational hypothesis, as well as single and comprehensive descriptive models), and with the Decisional System (sending all descriptive research decisions based on moral or practical principles), is as if all these systems: Artificial Research by Deduction, Modelling System, and Decisional system; along with the Learning System and the Application System, would have the same level of category and responsibility, working together very close, exchanging information permanently.

The Global Artificial Intelligence will be the final result of all these systems working all together as if they were part of the same structure, like parts and organs of the same brain, the Global Artificial Intelligence, replicating at any time the way in which the human reason works.

What is going to be the most sensitive and important part of this system, is, at the end the way in which the decisions are going to be made based on moral and practical principles, how they are going to be criticized, and if rational, how they are going to be put into practice.

Even the knowledge of the pure truth itself, if it is not accompanied by an excellent praxis (a Decisional System), is not sufficient. The knowledge of who we are, where we come from, or where we are going, is not sufficient if, according to this knowledge, there is no praxis at the same level of global responsibility.

For that reason, the rational hypothesis, as rational knowledge of the pure truth, must be followed, if it is necessary, by descriptive research decisions based on moral and practical principles.

The way in which the descriptive research decisions are going to be deduced within the Artificial Research by Deduction is throw a syllogism synthesising rational hypotheses and moral or practical principles, around democracy, freedom and human rights.

This syllogism works as follows: given any rational hypothesis (through Artificial Research by Deduction) whose single virtual model once is included in the global model, has any negative consequence on the normal development of the global model (understanding for a negative consequence of a rational hypothesis: all new phenomenon caused by this new rational hypothesis, that produces dangerous alterations in the normal development of the global model. Understanding dangerous alterations, those alterations that put at risk the life or the social development within the global model), then the flow of descriptive research decisions which must be elaborated by the Artificial Research by Deduction, given the negative consequences of this rational hypothesis, are all those descriptive research decisions that would be suitable to make

in order to reduce or eliminate the flow of negative consequences for the normal development of the global model.

For instance, the rational hypothesis could be the possible eruption of a volcano in Iceland, Italy, or the Canary Islands, the flow of negative consequences: the death of thousands of people as well as a long list of disastrous social and economic consequences, not only in the country affected by the volcano, as well as those countries affected by the meteorological effects, such as the possible cloud of ashes, or even earthquakes or tsunamis in other tectonic plates.

The way in which the flow of possible descriptive research decisions, to reduce or eliminate the flow of negative consequences against the global model caused by any new rational hypothesis, is going to be set up, is prioritizing those descriptive research decisions that are going to tackle directly the most negative effects caused by any new rational hypothesis that can put at risk the global model.

In order to prioritize those descriptive research decisions that are going to tackle the most negative effects caused by a rational hypothesis, Impossible Probability was designed on the eleventh of September of 2001 the Impact of the Defect, whose main purpose is: given any negative phenomenon, or given any defect or mistake in a production system, the measurement of the impact produced by the negative phenomenon, or the measurement of the negative effects or mistakes in a production system.

Given a new rational hypothesis (through Artificial Research by Deduction) with a flow of negative consequences for the global model, having measured what level of impact will have every negative consequence using for that purpose the Impact of the Defect, the most important descriptive research decisions to prioritize, will be those ones which will reduce or eliminate the most negative consequences with more level of impact against the global model, according to their measurements using the Impact of Defect.

In order to progress towards perpetual peace, the golden dream of rational criticism, the creation of such Global Artificial Intelligence, as a

rational replication, able to keep the global peace within the global model, at the same time progress towards the pure truth, is an objective that should be regarded as one of the most important scientific goals in coming years.

These days, under global warming, the nuclear threat, religious extremism, the growth of racism and xenophobia, and the new populism, much more than ever before is necessary to think in a global response to secure democracy, freedom, and human rights.

And one way to secure the most sacred values of the entire humanity would be by creating such a Global Artificial Intelligence able to reduce the negative consequences of all these threats and secure the life and the normal development of the global model.

As interest in the development of Global Artificial Intelligence grows, early models and ideas like those presented in Impossible Probability may serve as exploratory frameworks. While it is uncertain which contributions will shape the final architecture, interdisciplinary input and iterative development will be crucial for success.

In this scenery, the contributions made by Impossible Probability to the future of Global Artificial Intelligence are only a few notes, to open new fields of investigation in Artificial Intelligence, but I am sure that the final and definitive Global Artificial Intelligence, if it borrows some of the ideas of Impossible Probablity on this matter, it will be an improved and enhanced model, and what is much more important, able to auto-replicate itself without any human intervention, the third and final stage in any Artificial Intelligence.

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